

WHAT IS CLAIMED IS:

1. A stroke simulator that generates a stroke of a brake pedal, a size of the stroke being in accordance with an operation force of the brake pedal, characterized by comprising:

a housing;

a first piston which is movably disposed within the housing in a fluid-tight manner;

a hydraulic pressure chamber which is formed at an end side of the first piston and to which hydraulic pressure is supplied in accordance with the operation force of the brake pedal;

a second piston which is disposed at the other end side of the first piston and which can move integrally with the first piston;

a stopper that regulates a movement range of the second piston in a direction that increases a capacity of the hydraulic pressure chamber;

a first spring which is disposed between the first piston and the second piston and which urges the first piston in a direction that reduces the capacity of the hydraulic pressure chamber;

a second spring which has a second spring constant that is different to a first spring constant of the first spring, and which urges the second piston in the direction that reduces the capacity of the hydraulic pressure chamber, wherein

the second piston has a first protruding portion which protrudes towards the first piston and which can abut with the first piston, and a second protruding portion which protrudes towards the stopper and which can abut with the stopper, a section of the second piston that includes the first protruding portion and the second protruding portion being formed from a non-elastic material, and

when the first piston moves in the direction that increases the capacity of the hydraulic pressure chamber, the first piston and the second piston move integrally from a time point when the first piston abuts with the first protruding portion, and at a time point when the second protruding portion abuts with the stopper, movement of the second piston is regulated.

2. The stroke simulator according to claim 1, further characterized in that the non-elastic material is one of metal and hard resin.

3. The stroke simulator according to either claim 1, further characterized in that the stopper has a guide portion that regulates a movement range of the second piston in a direction that is orthogonal to a movement direction of the second piston.

4. The stroke simulator according to either claim 2, further characterized in that the stopper has a guide portion that regulates a movement range of the second piston in a direction that is orthogonal to a movement direction of the second piston.

5. The stroke simulator according to claim 1, further characterized in that

the first spring and the second spring are respective helical compression springs

the first piston includes a first fitting portion to which an end of the first spring is fitted, the first fitting portion regulating a movement range in a radial direction of the first spring,

the second piston includes a second fitting portion to which the other end of the first spring is fitted, the second fitting portion regulating the movement range in the radial direction of the first spring, and

the first spring is fitted to the first fitting portion by press fitting, and the first spring is fitted to the second fitting portion without execution of press fitting.

6. The stroke simulator according to claim 2, further characterized in that

the first spring and the second spring are respective helical compression springs

the first piston includes a first fitting portion to which an end of the first spring is fitted, the first fitting portion regulating a movement range in a radial direction of the first spring,

the second piston includes a second fitting portion to which the other end of the first spring is fitted, the second fitting portion regulating the movement range in the radial direction of the first spring, and

the first spring is fitted to the first fitting portion by press fitting, and the first spring is fitted to the second fitting portion without execution of press fitting.

7. The stroke simulator according to claim 3, further characterized in that

the first spring and the second spring are respective helical compression springs

the first piston includes a first fitting portion to which an end of the first spring is fitted, the first fitting portion regulating a movement range in a radial direction of the first spring,

the second piston includes a second fitting portion to which the other end of the first spring is fitted, the second fitting portion regulating the movement range in the radial direction of the first spring, and

the first spring is fitted to the first fitting portion by press fitting, and the first spring is

fitted to the second fitting portion without execution of press fitting.

8. The stroke simulator according to claim 4, further characterized in that

the first spring and the second spring are respective helical compression springs

the first piston includes a first fitting portion to which an end of the first spring is fitted, the first fitting portion regulating a movement range in a radial direction of the first spring,

the second piston includes a second fitting portion to which the other end of the first spring is fitted, the second fitting portion regulating the movement range in the radial direction of the first spring, and

the first spring is fitted to the first fitting portion by press fitting, and the first spring is fitted to the second fitting portion without execution of press fitting.

9. The stroke simulator according to claim 1, further characterized in that

when hydraulic pressure of the hydraulic pressure chamber is zero, a distance in a movement direction between the first piston and the second piston is taken to be a first stroke, a distance in the movement direction between the second piston and the stopper is

taken to be a second stroke, and a sum of the first stroke and the second stroke is taken to be an overall stroke, and

the first stroke, the second stroke and the overall stroke can all be changed by adjusting a height of the first protruding portion and the second protruding portion of the second piston.